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;***********************************************************
;                                                         *
;        PROGRAM ID:      FORMAT                          *
;                                                         *
;***********************************************************
;                                                         *
;        PRESENTED BY:   JADE COMPUTER PRODUCTS           *
;                        4901 W. ROSECRANS BLVD.          *
;                        HAWTHORNE, CALIFORNIA            *
;                        90250,   U.S.A.                  *
;                                                         *
;***********************************************************
;                                                         *
;        VERSION:         CP/M 2.2   RELEASE 2A           *
;                                                         *
;***********************************************************
;                                                         *
;        WRITTEN BY:    STAN KRUMME                       *
;                                                         *
;***********************************************************
; FORMAT   IS A SYSTEM UTILITY   WHICH PROVIDES A MEANS *
; TO WRITE A  SINGLE OR  DOUBLE DENSITY FORMAT ON ANY *
; OF DRIVES  A THROUGH D.   THIS UTILITY ALSO PROVIDES *
; A  COPY-SYSTEM-TRACKS  FEATURE.   THIS   IS  A USEFUL *
; FUNCTION FOR  FORMAT AS THE   SYSTEM   TRACKS  CAN BE *
; WRITTEN WITH THE  OPERATING SYSTEM  WHEN FORMATTED. *
; FORMAT IS 8080/8085/Z80 COMPATABLE.                  *
;***********************************************************


;***********************************************************
; FORMAT INJECTION MODULES ARE COMMAND COMPATABLE WITH*
; THE FOLLOWING  WESTERN  DIGITAL  CONTROLLER   CHIPS. *
; DOUBLE D  USER SWITCH 0  (U0 OR R0)   MUST BE SET TO *
; INDICATE THE   CONTROLLER CHIP  DATA  BUS  POLARITY. *
;***********************************************************
;        CONTROLLER IC            USER SW0             *
;        --------------           --------             *
;        FD1791-02 (01)             CLOSED             *
;        FD1793-02 (01)             OPENED             *
;        FD1795-02                  CLOSED             *
;        FD1797-02                  OPENED             *
;***********************************************************


;***********************************************************
; RELEASE 2A:    SINGLE AND DOUBLE SIDED DRIVES CAN BE *
; FORMATED.  INSPECTION OF TWO SIDED* SIGNAL FROM THE *
; DISK DRIVE DETERMINES NUMBER OF SIDES.   WITH DOUBLE *
; SIDED DISKETTES, BOTH SIDES FORM ONE LOGICAL DISK. *
; EACH DOUBLE DENSITY TRACK NOW CONTAINS 50 SECTORS. *
;***********************************************************
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                    ;*******************************************************
                    ; DRIVER MODULE DEFINITIONS                            *
                    ;*******************************************************

000A                LF      ==      00AH            ;ASCII LINE FEED.
000D                CR      ==      00DH            ;CARRAIGE RETURN.
0024                EOM     ==      '$'             ;STRING TERMINATOR.
0100                TPA     ==      0100H           ;TRANSIENT PROGRAM.
0000                TRK.0   ==      0               ;TRACK 0.
0001                TRK.1   ==      1               ;TRACK 1.
0002                TRK.2   ==      2               ;TRACK 2.
0080                SEC.SZ  ==      128             ;128 BYTES PER SECTOR.
0001                ID.SEC  ==      1               ;ID SECTOR NUMBER.
0000                REBOOT  ==      0               ;REBOOT ADDRESS.
0001                BS.PTR  ==      0001H           ;WARM ADDR POINTER.
0001                NO.LOG  ==      01H             ;REQUEST NO LOG-ON.
00FE                FT.ERC  ==      11111110B       ;FORMAT ERROR MASK.
0001                FT.TSM  ==      00000001B       ;TWO SIDED MASK.


                    ;*******************************************************
                    ; INJECTION MODULE DEFINITIONS                         *
                    ;*******************************************************

1700                FMT.EA  ==      1700H           ;FORMAT EXEC ADDRESS.
0005                WD.TRK  ==      005H            ;DOUBLE D TRACK PORT.
0007                WD.DTA  ==      007H            ;DOUBLE D DATA PORT.
0080                XP.DSH  ==      80H             ;DATA SYNC HOLD PORT.
0000                ZEROS   ==      00000000B       ;ALL ZERO BYTE.
00FF                ONES    ==      11111111B       ;ALL ONES BYTE.


                    ;*******************************************************
                    ; BDOS CALL - VECTOR NUMBERS                           *
                    ;*******************************************************

0005                BDOS    ==      0005H           ;SYSTEM CALL ADDR.
0009                BC.PTX  ==      009H            ;PRINT STRING CONSOLE.
000A                BC.RCB  ==      00AH            ;READ CONSOLE BUFFERD.


                    ;*******************************************************
                    ; ASSEMBLER DIRECTIVES                                 *
                    ;*******************************************************

                    .I8080
                    .PABS
                    .PHEX
                    .XLINK
0100                .LOC    TPA


                    ;*******************************************************
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                        ;*********************************************************
                        ; PROGRAM BEGINS                                        *
                        ;*********************************************************

   0100    C3 0146      BEGIN:  JMP      INIT              ;GO TO INITIALIZE.

                        ;*********************************************************
                        ; ASCII IDENTIFICATION INSERT                           *
                        ;*********************************************************

   0103    4A4144452043         .ASCII   ΄JADE COMPUTER PRODUCTS ΄
   011A    444F55424C45         .ASCII   ΄DOUBLE D - FORMAT 8" ΄
   012F    56455253494F         .ASCII   ΄VERSION 2.2 RELEASE 2A ΄

                        ;*********************************************************
                        ; SET STACK POINTER AND ISSUE LOG-ON                    *
                        ;*********************************************************

   0146    31 0500      INIT:   LXI      SP,SP.TOP         ;SET STACK POINTER.
   0149    11 0716              LXI      D,MSG.BG          ;LOAD MESSAGE ADDR.
   014C    CD 0297              CALL     MSG.OT            ;ISSUE MESSAGE.

                        ;*********************************************************
                        ; LOAD BIOS VECTORS JUMP TABLE - WARM THRU FORMAT       *
                        ;*********************************************************

   014F    01 0033              LXI      B,BS.VSZ          ;SET BIOS VECTORS SIZE.
   0152    11 02A4              LXI      D,BS.WRM          ;SET FORMAT TABLE.
   0155    2A 0001              LHLD     BS.PTR            ;WARM VECTOR POINTER.
   0158    CD 02D7              CALL     B.MOVE            ;BLOCK MOVE VECTORS.

                        ;*********************************************************
                        ; SELECT DRIVE TO FORMAT ON                             *
                        ;*********************************************************

   015B    21 0781              LXI      H,MSG.FD          ;FORMAT ON DRIVE MSG.
   015E    CD 0485              CALL     SEL.DR            ;CALL SELECT DRIVE.
   0161    32 04DF              STA      FD.NBR            ;FORMAT DRIVE NMBR.

                        ;*********************************************************
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                    ;*********************************************************
                    ; DISPLAY FUNCTIONS LIST                                 *
                    ;*********************************************************

     0164   11 07BB  LIST:    LXI     D,MSG.FL        ;FUNCTIONS MSG ADDR.
     0167   CD 0297           CALL    MSG.OT          ;ISSUE THIS MESSAGE.

                    ;*********************************************************
                    ; INQUIRE SELECTION                                      *
                    ;*********************************************************

     016A   11 08F4  SELECT:  LXI     D,MSG.SF        ;SELECT FUNCTION MSG.
     016D   CD 0297           CALL    MSG.OT          ;ISSUE THIS MESSAGE.
     0170   CD 029C           CALL    CNS.IN          ;GET CONSOLE CHARACTER.
     0173   3A 0501           LDA     RC.NBR          ;LOAD BUFFER SIZE.
     0176   FE01              CPI     1               ;CHECK FOR 1 CHARACTER.
     0178   C2 016A           JNZ     SELECT          ;OTHER THAN 1 TOO BAD.

                    ;*********************************************************
                    ; SELECT FUNCTION DRIVER                                 *
                    ;*********************************************************

     017B   3A 0502           LDA     RC.TXT+0        ;LOAD CONSOLE CHAR.
     017E   FE31              CPI     "1"
     0180   CA 01AA           JZ      FUN.1           ;FMT DOUBLE DENSITY.
     0183   FE32              CPI     "2"
     0185   CA 0208           JZ      FUN.2           ;FMT SINGLE DENSITY.
     0188   FE33              CPI     "3"
     018A   CA 01D2           JZ      FUN.3           ;FMT 3740.
     018D   FE34              CPI     "4"
     018F   CA 01EB           JZ      FUN.4           ;READ SYSTEM TRACKS.
     0192   FE35              CPI     "5"
     0194   CA 025D           JZ      FUN.5           ;WRITE SYSTEM TRACKS.
     0197   FE2A              CPI     "*"
     0199   CA 023B           JZ      FMT.ST          ;FORMAT SYSTEM TRACKS.
     019C   FE27              CPI     "'"
     019E   CA 04CC           JZ      RST.7           ;DDT TRAP.

                    ;*********************************************************
                    ; MUST BE A BAD CHOICE                                   *
                    ;*********************************************************

     01A1   11 07A2           LXI     D,MSG.SE        ;SELECT ERROR MESSAGE.
     01A4   CD 0297           CALL    MSG.OT          ;ISSUE MESSAGE.
     01A7   C3 0164           JMP     LIST            ;DIPLAY LIST AGAIN.

                    ;*********************************************************
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                        ;***********************************************************
                        ; FUNCTION 1 - FORMAT IN DOUBLE DENSITY                    *
                        ;***********************************************************

    01AA   3A 0647      FUN.1:  LDA     DD.FLG          ;LOAD DDENS FLAGS.
    01AD   32 04DC              STA     F.FLAG          ;STORE FORMAT FLAGS.
    01B0   3E00                 MVI     A,TRK.O         ;TRACK 0.
    01B2   32 04D9              STA     TRK.NO          ;SET TRACK NUMBER.
    01B5   CD 031B              CALL    FMT.SD          ;FORMAT TRACK SDENS.
    01B8   C2 028E              JNZ     TRK.ER          ;JUMP ERROR DETECTED.
    01BB   3E01                 MVI     A,TRK.1         ;TRACK 1 VALUE.
    01BD   32 04D9              STA     TRK.NO          ;SET TRACK NUMBER.
    01C0   CD 0321      ..REPT: CALL    FMT.DD          ;FORMAT TRACK DDENS.
    01C3   C2 028E              JNZ     TRK.ER          ;JUMP ERROR DETECTED.
    01C6   CD 0279              CALL    TRK.NX          ;SET FOR NEXT TRACK.
    01C9   CA 01C0              JZ      ..REPT          ;FORMAT NEXT TRACK.
    01CC   CD 02F2      ..ID:   CALL    WDD.ID          ;WRITE DDENS ID SECTOR.
    01CF   C3 016A              JMP     SELECT          ;SELECT NEW FUNCTION.


                        ;***********************************************************
                        ; FUNCTION 3 - FORMAT STANDARD 3740 - SINGLE SIDED        *
                        ;***********************************************************

    01D2   3E00         FUN.3:  MVI     A,0             ;3740 SDENS FLAGS.
    01D4   32 04DC              STA     F.FLAG          ;STORE FORMAT FLAGS.
    01D7   3E00                 MVI     A,TRK.O         ;TRACK 0.
    01D9   32 04D9              STA     TRK.NO          ;SET TRACK NUMBER.
    01DC   CD 031B      ..REPT: CALL    FMT.SD          ;FORMAT TRACK SDENS.
    01DF   C2 028E              JNZ     TRK.ER          ;JUMP ERROR DETECTED.
    01E2   CD 0279              CALL    TRK.NX          ;SET FOR NEXT TRACK.
    01E5   CA 01DC              JZ      ..REPT          ;FORMAT NEXT TRACK.
    01E8   C3 016A              JMP     SELECT          ;SELECT NEW FUNCTION.


                        ;***********************************************************
                        ; FUNCTION 4 - READ SYSTEM TRACKS                         *
                        ;***********************************************************

    01EB   21 090E      FUN.4:  LXI     H,MSG.RS        ;READ DRIVE MSG.
    01EE   CD 0485              CALL    SEL.DR          ;SELECT READ SYS DRV.
    01F1   3E52                 MVI     A,'R'           ;READ TRANSFER CODE.
    01F3   32 04D4              STA     TF.DIR          ;SET TRANSFER DIRC.
    01F6   32 04DD              STA     SYS.RF          ;SET SYSTEM READ FLAG.
    01F9   CD 0355              CALL    TRNSFR          ;READ SYSTEM TRACKS.
    01FC   3A 04DF              LDA     FD.NBR          ;GET FORMAT DRV NMBR.
    01FF   4F                   MOV     C,A             ;PUT INTO C REG.
    0200   1E01                 MVI     E,NO.LOG        ;INSURE NO LOGON.
    0202   CD 02BC              CALL    BS.DSK          ;BIOS SELECT DISK.
    0205   C3 016A              JMP     SELECT          ;RESELECT FUNCTION.


                        ;***********************************************************
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                        ;*********************************************************
                        ; FUNCTION 2 - FORMAT IN SINGLE DENSITY                  *
                        ;*********************************************************

0208    3A 0547    FUN.2:  LDA     SD.FLG          ;LOAD SDENS FLAGS.
020B    32 04DC            STA     F.FLAG          ;STORE FORMAT FLAGS.
020E    3E00              MVI     A,TRK.O         ;TRACK O.
0210    32 04D9            STA     TRK.NO          ;SET TRACK NUMBER.
0213    CD 031B            CALL    FMT.SD          ;FORMAT TRACK SDENS.
0216    C2 028E            JNZ     TRK.ER          ;JUMP ERROR DETECTED.
0219    3E01              MVI     A,TRK.1         ;TRACK 1
021B    32 04D9            STA     TRK.NO          ;SET TRACK NUMBER.
021E    CD 0321            CALL    FMT.DD          ;FORMAT TRACK DDENS.
0221    C2 028E            JNZ     TRK.ER          ;JUMP ERROR DETECTED.
0224    3E02              MVI     A,TRK.2         ;TRACK 2.
0226    32 04D9            STA     TRK.NO          ;SET TRACK NUMBER.
0229    CD 031B    ..REPT: CALL    FMT.SD          ;FORMAT TRACK SDENS.
022C    C2 028E            JNZ     TRK.ER          ;JUMP ERROR DETECTED.
022F    CD 0279            CALL    TRK.NX          ;SET FOR NEXT TRACK.
0232    CA 0229            JZ      ..REPT          ;FORMAT NEXT TRACK.
0235    CD 02E2    ..ID:   CALL    WSD.ID          ;WRITE SDENS ID SECTOR.
0238    C3 016A            JMP     SELECT          ;SELECT NEW FUNCTION.

                        ;*********************************************************
                        ; NON DOCUMENTED FUNCTION - FORMAT JADE SYSTEM TRACKS *
                        ;*********************************************************
                        ; USED FOR SPECIAL PURPOSE - NOT NEEDED BY END USER    *
                        ;*********************************************************

023B    3A 0547    FMT.ST: LDA     SD.FLG          ;LOAD SDENS FLAGS.
023E    32 04DC            STA     F.FLAG          ;STORE FORMAT FLAGS.
0241    3E00              MVI     A,TRK.O         ;TRACK O.
0243    32 04D9            STA     TRK.NO          ;SET TRACK NUMBER.
0246    CD 031B            CALL    FMT.SD          ;FORMAT TRACK SDENS.
0249    C2 028E            JNZ     TRK.ER          ;JUMP ERROR DETECTED.
024C    3E01              MVI     A,TRK.1         ;TRACK 1
024E    32 04D9            STA     TRK.NO          ;SET TRACK NUMBER.
0251    CD 0321            CALL    FMT.DD          ;FORMAT TRACK DDENS.
0254    C2 028E            JNZ     TRK.ER          ;JUMP ERROR DETECTED.
0257    CD 02E2            CALL    WSD.ID          ;WRITE SDENS ID SECTOR.
025A    C3 016A            JMP     SELECT          ;SELECT NEW FUNCTION.

                        ;*********************************************************
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                    ;*************************************************************
                    ; FUNCTION 5 - WRITE SYSTEM TRACKS                          *
                    ;*************************************************************

025D   3A 04DD      FUN.5:  LDA    SYS.RF        ;LOAD SYSTEM READ FLAG.
0260   FE52                 CPI    ´R´           ;TEST IF READ CODE.
0262   C2 0270              JNZ    ..NSYS        ;JUMP IF NO SYSTEM.
0265   3E57                 MVI    A,´W´         ;WRITE TRANSFER CODE.
0267   32 04D4              STA    TF.DIR        ;SET TRANSFER DIRC.
026A   CD 0355              CALL   TRNSFR        ;WRITE SYSTEM TRACKS.
026D   C3 016A              JMP    SELECT        ;WRITE ANOTHER DISK.
0270   11 095E      ..NSYS: LXI    D,MSG.NR      ;NO SYSTEM LOADED MSG.
0273   CD 0297              CALL   MSG.OT        ;ISSUE THIS MESSAGE.
0276   C3 016A              JMP    SELECT        ;SELECT NEW FUNCTION.


                    ;*************************************************************
                    ; NEXT TRACK SELECT ROUTINE                                 *
                    ;*************************************************************

0279   3A 04DA      TRK.NX: LDA    TRK.MX        ;LOAD MAX TRACK NMBR.
027C   47                   MOV    B,A           ;SAVE IN REG B.
027D   3A 04D9              LDA    TRK.NO        ;GET THIS TRACK NO.
0280   B8                   CMP    B             ;CHECK FOR LAST TRACK.
0281   CA 028A              JZ     ..DONE        ;JUMP IF LAST TRACK.
0284   3C                   INR    A             ;GET NEXT TRACK.
0285   32 04D9              STA    TRK.NO        ;STORE NEXT TRACK.
0288   AF                   XRA    A             ;SET ZERO FLAG.
0289   C9                   RET                  ;RETURN TO CALLER.
028A   3EFF         ..DONE: MVI    A,ONES        ;SET ALL ONES.
028C   A7                   ANA    A             ;SET FLAG NOT ZERO.
028D   C9                   RET                  ;LAST TRACK EXIT.


                    ;*************************************************************
                    ; FORMAT TRACK ERROR                                        *
                    ;*************************************************************

028E   11 0945      TRK.ER: LXI    D,MSG.FE      ;FORMAT ERROR MSG ADDR.
0291   CD 0297              CALL   MSG.OT        ;DISPLAY MESSAGE.
0294   C3 016A              JMP    SELECT        ;SELECT NEW FUNCTION.


                    ;*************************************************************
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                    ;*******************************************************
                    ; MESSAGE DISPLAY ROUTINE                             *
                    ;*******************************************************

0297    0E09        MSG.OT: MVI     C,BC.PTX            ;PRINT TEXT VECTOR.
0299    C3 0005             JMP     BDOS               ;CONTINUE IN BDOS.


                    ;*******************************************************
                    ; CONSOLE INPUT ROUTINE                               *
                    ;*******************************************************

029C    11 0500     CNS.IN: LXI     D,RC.BUF           ;KEYBOARD BUFFER ADDR.
029F    0E0A                MVI     C,BC.RCB           ;BDOS CONSOLE BUF READ.
02A1    C3 0005             JMP     BDOS               ;CONTINUE IN BDOS.


                    ;*******************************************************
                    ; BIOS VECTOR DEFINITIONS                             *
                    ;*******************************************************

02A4    C3 0000     BS.WRM: JMP     0                  ;RELOAD CCP/BDOS.
02A7    C3 0000             JMP     0                  ;GET CONSOLE STATUS.
02AA    C3 0000             JMP     0                  ;CONSOLE CHAR INPUT.
02AD    C3 0000             JMP     0                  ;CONSOLE CHAR OUTPUT.
02B0    C3 0000             JMP     0                  ;PRINTER OUTPUT.
02B3    C3 0000             JMP     0                  ;PUNCH CHARACTER OUT.
02B6    C3 0000             JMP     0                  ;READER INPUT.
02B9    C3 0000             JMP     0                  ;HOME SELECTED DRIVE.
02BC    C3 0000     BS.DSK: JMP     0                  ;SELECT DISK DRIVE.
02BF    C3 0000     BS.TRK: JMP     0                  ;SET TRACK NUMBER.
02C2    C3 0000     BS.SEC: JMP     0                  ;SET SECTOR NUMBER.
02C5    C3 0000     BS.DMA: JMP     0                  ;SET TRANSFER ADDR.
02C8    C3 0000     BS.RDS: JMP     0                  ;READ DISK SECTOR.
02CB    C3 0000     BS.WRS: JMP     0                  ;WRITE DISK SECTOR.
02CE    C3 0000             JMP     0                  ;LIST DEV STATUS.
02D1    C3 0000             JMP     0                  ;SECTOR TRANSLATE.
02D4    C3 0000     BS.FMT: JMP     0                  ;FORMAT DISK TRACK.
0033                BS.VSZ  ==      .-BS.WRM           ;CALCULATE SIZE.


                    ;*******************************************************
                    ; BLOCK MOVE SUBROUTINE                               *
                    ;*******************************************************

02D7    7E          B.MOVE: MOV     A,M                ;GET BYTE
02D8    23                  INX     H                  ;INC SOURCE.
02D9    12                  STAX    D                  ;STORE BYTE.
02DA    13                  INX     D                  ;INC DESTINATION.
02DB    0B                  DCX     B                  ;ONE LESS TO DO.
02DC    78                  MOV     A,B                ;GET B REG.
02DD    B1                  ORA     C                  ;OR IN C REG.
02DE    C2 02D7             JNZ     B.MOVE             ;REPEAT FOR LENGTH.
02E1    C9                  RET                        ;RETURN CALLER.


                    ;*******************************************************
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                    ;*************************************************************
                    ; WRITE ID SECTOR                                           *
                    ;*************************************************************

                    ;*******( SET TRANSFER ADDRESS )**************************

02E2    01 0516     WSD.ID: LXI     B,IDS.SS        ;ID SECTOR ADDRESS.
02E5    3A 04D8             LDA     TS.FLG          ;GET TWO SIDES FLG.
02E8    A7                  ANA     A               ;TEST.
02E9    CA 02FF             JZ      WRT.ID          ;JUMP ONE SIDED.
02EC    01 0596             LXI     B,IDS.DS        ;DOUBLE SIDED.
02EF    C3 02FF             JMP     WRT.ID          ;JUMP TWO SIDED.
02F2    01 0616     WDD.ID: LXI     B,IDS.SD        ;ID SECTOR ADDRESS.
02F5    3A 04D8             LDA     TS.FLG          ;GET TWO SIDES FLG.
02F8    A7                  ANA     A               ;TEST.
02F9    CA 02FF             JZ      WRT.ID          ;JUMP ONE SIDED.
02FC    01 0696             LXI     B,IDS.DD        ;DOUBLE SIDED.
02FF    CD 02C5     WRT.ID: CALL    BS.DMA          ;BIOS TRANSFER ADDR.

                    ;*******( SET TRACK AND SECTOR NUMBERS )***************

0302    0E00                MVI     C,TRK.O         ;TRACK O SET.
0304    CD 02BF             CALL    BS.TRK          ;BIOS SET TRACK.
0307    0E01                MVI     C,ID.SEC        ;ID SECTOR VALUE.
0309    CD 02C2             CALL    BS.SEC          ;BIOS SET SECTOR.

                    ;*******( PERFORM WRITE SECTOR )***********************

030C    CD 02CB             CALL    BS.WRS          ;BIOS WRITE SECTOR.
030F    B7                  ORA     A               ;SET CONDITION CODES.
0310    C8                  RZ                      ;RETURN USER GOOD.
0311    11 092B             LXI     D,MSG.NC        ;TRANSFER INCOMPLETE.
0314    CD 0297             CALL    MSG.OT          ;ISSUE MESSAGE.
0317    3EFF                MVI     A,ONES          ;SET ACUMULATOR.
0319    A7                  ANA     A               ;SET FLAGS NOT ZERO.
031A    C9                  RET                     ;ERROR RETURN.

                    ;*************************************************************
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                    ;********************************************************
                    ; FORMAT TRACK DRIVER                                  *
                    ;********************************************************

                    ;*******( DENSITY ENTRIES )*****************************

031B    01 0A00     FMT.SD: LXI     B,FT3740        ;LOAD INJECTION ADDR.
031E    C3 0324             JMP     ST.DMA          ;GO SET DMA ADDR.
0321    01 0B00     FMT.DD: LXI     B,FTJ50D        ;LOAD INJECTION ADDR.

                    ;*******( SET INJECTION MODULE ADDRESS )***************

0324    CD 02C5     ST.DMA: CALL    BS.DMA          ;SET TRANSFER ADDRESS.

                    ;*******( SET TRACK NUMBER AND DCM FLAGS )*************

0327    3A 04D9             LDA     TRK.NO          ;LOAD TRACK NMBR.
032A    4F                  MOV     C,A             ;PUT INTO C REGISTER.
032B    CD 02BF             CALL    BS.TRK          ;SET TRACK NMBR.

032E    3A 04DC             LDA     F.FLAG          ;LOAD DCM FLAG.
0331    4F                  MOV     C,A             ;DCM FLAGS.
0332    CD 02C2             CALL    BS.SEC          ;SET DCM FLAGS.

                    ;*******( PERFORM FORMAT TRACK )***********************

0335    CD 02D4             CALL    BS.FMT          ;BIOS WRITE TRACK.
0338    32 04D7             STA     FT.STS          ;FORMAT STATUS.
033B    E6FE                ANI     FT.ERC          ;TEST FOR ERRORS.
033D    C0                  RNZ                     ;ERROR EXIT.

                    ;*******( SET CONTROLS FOR SIDE/SIDES )***************

033E    3A 04D7             LDA     FT.STS          ;GET STATUS.
0341    E601                ANI     FT.TSM          ;TEST TWO SIDES FLAG.
0343    32 04D8             STA     TS.FLG          ;STORE FLAG.
0346    C2 034E             JNZ     ..TWSD          ;TWO SIDES IS A 1.
0349    3E4C                MVI     A,77-1          ;SINGLE SIDED MAX.
034B    C3 0350             JMP     ..EXIT          ;EXIT.
034E    3E99        ..TWSD: MVI     A,2*77-1        ;DOUBLE SIDED MAX.
0350    32 04DA     ..EXIT: STA     TRK.MX          ;SET MAX TRACK.
0353    AF                  XRA     A               ;SET ZERO FLAG.
0354    C9                  RET                     ;RETURN TO CALLER.

                    ;********************************************************
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                        ;*********************************************************
                        ; SYSTEM TRACKS TRANSFER FUNCTION - ENTRY POINT          *
                        ;*********************************************************

                        ;*******( TRANSFER INITIALIZE )**************************

0355    21 03A9     TRNSFR: LXI     H,ST.LST             ;ADDR OF TRANSFER LIST.
0358    22 04D2             SHLD    TF.PTR               ;SET TRANSFER POINTER.

                        ;*******( SET BIOS TRACK NUMBER )***********************

035B    CD 0391     ..REPT: CALL    ..PLST               ;POP BYTE FROM LIST.
035E    FEFF                CPI     EOL                  ;TEST FOR END OF LIST.
0360    C8                  RZ                           ;EXIT TRANSFER.
0361    CD 02BF             CALL    BS.TRK               ;BIOS SET TRACK.

                        ;*******( SET BIOS SECTOR NUMBER )**********************

0364    CD 0391             CALL    ..PLST               ;POP BYTE FROM LIST.
0367    CD 02C2             CALL    BS.SEC               ;BIOS SET SECTOR.

                        ;*******( SET BIOS TRANSFER ADDRESS )*******************

036A    CD 0391             CALL    ..PLST               ;POP BYTE FROM LIST.
036D    CD 039B             CALL    ..ADDR               ;CALCULATE ADDRESS.
0370    CD 02C5             CALL    BS.DMA               ;BIOS TRANSFER ADDR.

                        ;*******( SECTOR TRANSFER OPERATION )*******************

0373    21 0386             LXI     H,..RETN             ;LOAD RETURN ADDRESS.
0376    E5                  PUSH    H                    ;PUSH ONTO STACK.
0377    3A 04D4             LDA     TF.DIR               ;LOAD TRNSFR DIRECTION.
037A    FE57                CPI     'W'                  ;SEE IF WRITE FUNCTION.
037C    CA 02CB             JZ      BS.WRS               ;BIOS WRITE SECTOR.
037F    FE52                CPI     'R'                  ;SEE IF READ FUNCTION.
0381    CA 02C8             JZ      BS.RDS               ;BIOS READ SECTOR.
0384    3EFF                MVI     A,ONES               ;ERROR CODE NOT R/W.
0386    B7          ..RETN: ORA     A                    ;SET CONDITION CODES.
0387    CA 035B             JZ      ..REPT               ;DO SOME MORE.

                        ;*******( ENCOUNTERED DIFFICULTY )*********************

038A    11 092B             LXI     D,MSG.NC             ;MESSAGE ADDRESS.
038D    CD 0297             CALL    MSG.OT               ;SEND MESSAGE.
0390    C9                  RET                          ;GO HOME.

                        ;*********************************************************
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                        ;****************************************************************
                        ; POP LIST SUBROUTINE                                          *
                        ;****************************************************************
0391    2A 04D2    ..PLST: LHLD    TF.PTR          ;LOAD LIST POINTER.
0394    4E                 MOV     C,M             ;GET ITEM NUMBER.
0395    23                 INX     H               ;INCREMENT POINTER.
0396    22 04D2            SHLD    TF.PTR          ;STORE LIST POINTER.
0399    79                 MOV     A,C             ;MOVE C TO ACUM.
039A    C9                 RET                     ;RETURN TO CALLER.

                        ;****************************************************************
                        ; GET MEMORY ADDRESS SUBROUTINE                                *
                        ;****************************************************************
039B    A7         ..ADDR: ANA     A               ;CLEAR CARRY BIT.
039C    1F                 RAR                     ;DIVIDE BY 2.
039D    47                 MOV     B,A             ;HI ORDER TO B REG.
039E    3E00               MVI     A,0             ;CLEAR ACUMULATOR.
03A0    1F                 RAR                     ;CARRY BIT TO MSB.
03A1    4F                 MOV     C,A             ;LO ORDER TO C REG.
03A2    2A 04D0            LHLD    TF.INX          ;LOAD TRANSFER INDEX.
03A5    09                 DAD     B               ;ADD IN OFFSET.
03A6    44                 MOV     B,H             ;HALF MOV BC,HL.
03A7    4D                 MOV     C,L             ;THE OTHER (HA!)
03A8    C9                 RET                     ;RETURN TO CALLLER.

                        ;****************************************************************
```

```
                        ;****************************************************
                        ; THE FOLLOWING  IS A  LIST OF  SYSTEM TRACK  SECTORS *
                        ; USED  BY THE  TRNSFR  SUBROUTINE.   THERE ARE THREE *
                        ; ENTRIES PER SECTOR.   1ST IS TRACK NUMBER.   2ND IS *
                        ; SECTOR NUMBER.   3RD IS MEMORY LOAD OFFSET.        *
                        ;****************************************************
                        ; SECTORS 2 THRU 26 ARE TRANSFERED ON TRACK 0. SECTOR *
                        ; 1 IS NOT TRANSFERED,  THIS IS THE  IDENTITY SECTOR. *
                        ; TRACK 0 SECTOR ARE LOCATED IN SEQUENCIAL ORDER,  SO *
                        ; THIS LIST IS STAGGERED.   SECTORS  1  THRU  48  ARE *
                        ; TRANSFERED ON TRACK 1.                              *
                        ;****************************************************

    0000                TK0     ==      0           ;DEFINE TRACK 0.
    0001                TK1     ==      1           ;DEFINE TRACK 1.
    00FF                EOL     ==      0FFH        ;DEFINE END OF LIST.


                        ;****************************************************

    03A9  000404000808 ST.LST: .BYTE   TK0,04,04,TK0,08,08,TK0,12,12,TK0,16,16
    03B5  001414001818         .BYTE   TK0,20,20,TK0,24,24,TK0,02,02,TK0,06,06
    03C1  000A0A000E0E         .BYTE   TK0,10,10,TK0,14,14,TK0,18,18,TK0,22,22
    03CD  001A1A000505         .BYTE   TK0,26,26,TK0,05,05,TK0,09,09,TK0,13,13
    03D9  001111001515         .BYTE   TK0,17,17,TK0,21,21,TK0,25,25,TK0,03,03
    03E5  000707000B0B         .BYTE   TK0,07,07,TK0,11,11,TK0,15,15,TK0,19,19
    03F1  001717               .BYTE   TK0,23,23

    03F4  01011B01021C         .BYTE   TK1,01,27,TK1,02,28,TK1,03,29,TK1,04,30
    0400  01051F010620         .BYTE   TK1,05,31,TK1,06,32,TK1,07,33,TK1,08,34
    040C  010923010A24         .BYTE   TK1,09,35,TK1,10,36,TK1,11,37,TK1,12,38
    0418  010D27010E28         .BYTE   TK1,13,39,TK1,14,40,TK1,15,41,TK1,16,42
    0424  01112B01122C         .BYTE   TK1,17,43,TK1,18,44,TK1,19,45,TK1,20,46
    0430  01152F011630         .BYTE   TK1,21,47,TK1,22,48,TK1,23,49,TK1,24,50
    043C  011933011A34         .BYTE   TK1,25,51,TK1,26,52,TK1,27,53,TK1,28,54
    0448  011D37011E38         .BYTE   TK1,29,55,TK1,30,56,TK1,31,57,TK1,32,58
    0454  01213B01223C         .BYTE   TK1,33,59,TK1,34,60,TK1,35,61,TK1,36,62
    0460  01253F012640         .BYTE   TK1,37,63,TK1,38,64,TK1,39,65,TK1,40,66
    046C  012943012A44         .BYTE   TK1,41,67,TK1,42,68,TK1,43,69,TK1,44,70
    0478  012D47012E48         .BYTE   TK1,45,71,TK1,46,72,TK1,47,73,TK1,48,74

    0484  FF                   .BYTE   EOL         ;END OF LIST.


                        ;****************************************************
```

```
                    ;*********************************************************
                    ; SELECT DRIVE THRU BIOS                                 *
                    ;*********************************************************

                    ;*******( DISPLAY MESSAGE AND WAIT FOR RESPONSE )******

0485   22 04D5      SEL.DR: SHLD    MSG.SV          ;SAVE MESSAGE ADDRESS.
0488   2A 04D5      ..REPT: LHLD    MSG.SV          ;LOAD MESSAGE ADDRESS.
048B   EB                   XCHG                    ;PUT ADDRESS IN DE.
048C   CD 0297              CALL    MSG.OT          ;ISSUE MESSAGE.
048F   CD 029C              CALL    CNS.IN          ;CONSOLE INPUT.
0492   3A 0501              LDA     RC.NBR          ;LOAD NMBR OF CHARS.
0495   FE01                 CPI     1               ;SEE IF ONE CHARACTER.
0497   C2 0488              JNZ     ..REPT          ;IF NOT 1 CHAR TOO BAD.

                    ;*******( SEE IF DRIVE LETTER GOOD )******************

049A   3A 0502              LDA     RC.TXT          ;LOAD LETTER.
049D   D641                 SUI     'A'             ;GET NUMBER.
049F   DA 04B1              JC      ..ILLG          ;ILLEGAL, REPEAT.
04A2   FE04                 CPI     04H             ;DRIVE A THRU D?
04A4   DA 04BA              JC      ..NMBR          ;GOOD NUMBER.
04A7   D620                 SUI     'A'-'A'         ;OFFSET LOWER CASE.
04A9   DA 04B1              JC      ..ILLG          ;ILLEGAL, REPEAT.
04AC   FE04                 CPI     04H             ;LOWER A THRU D?
04AE   DA 04BA              JC      ..NMBR          ;LEGAL DRIVE.

                    ;*******( EXIT TO RESELECT FUNCTION )******************

04B1   11 07A2      ..ILLG: LXI     D,MSG.SE        ;'SELECT ERROR'
04B4   CD 0297              CALL    MSG.OT          ;ISSUE MESSAGE.
04B7   C3 0488              JMP     ..REPT          ;REPEAT SELECTION.

                    ;*******( VALID DRIVE NUMBER )******************

04BA   32 04DE      ..NMBR: STA     SV.NBR          ;SAVE DRIVE NUMBER.
04BD   4F                   MOV     C,A             ;DRIVE NMBR TO C.
04BE   1E01                 MVI     E,NO.LOG        ;LOG ON VECTOR.
04C0   CD 02BC              CALL    BS.DSK          ;BIOS SELECT DISK.
04C3   7C                   MOV     A,H             ;CHECK RETURN ADDR.
04C4   B5                   ORA     L               ;SET FLAGS Z/NZ.
04C5   CA 04B1              JZ      ..ILLG          ;BIOS SAID NOGO IF 0.
04C8   3A 04DE              LDA     SV.NBR          ;GET NUMBER.
04CB   C9                   RET                     ;RETURN CALLER.

                    ;*********************************************************
```

```
                        ;********************************************************
                        ; SOFTWARE TRAPS - DDT EXIT                            *
                        ;********************************************************

04CC    FF              RST.7:  RST     7                       ;EXIT FORMAT.
04CD    C3 016A                 JMP     SELECT                  ;RETURN FOR SELECTION.

                        ;********************************************************
                        ; WORKING VARIABLES                                    *
                        ;********************************************************

04D0    0F80            TF.INX: .WORD   0F80H           ;TRANSFER INDEX.
04D2    0000            TF.PTR: .WORD   0               ;LIST ADDRESS POINTER.
04D4    00              TF.DIR: .BYTE   0               ;TRANSFER DIRECTION.
04D5    0000            MSG.SV: .WORD   0               ;MESSAGE SAVE ADDRESS.
04D7    00              FT.STS: .BYTE   0               ;FORMAT STATUS SAVE.
04D8    00              TS.FLG: .BYTE   0               ;TWO SIDED DRIVE FLAG.
04D9    00              TRK.NO: .BYTE   0               ;TRACK NUMBER HOLD.
04DA    00              TRK.MX: .BYTE   0               ;LAST TRACK LIMIT.
04DB    00              SEC.NO: .BYTE   0               ;SECTOR NUMBER HOLD.
04DC    00              F.FLAG: .BYTE   0               ;FORMAT FLAG (DCM).
04DD    00              SYS.RF: .BYTE   0               ;SYSTEM TRACK READ FLAG.
04DE    00              SV.NBR: .BYTE   0               ;SEL.DV TEMP STORAGE.
04DF    00              FD.NBR: .BYTE   0               ;FORMAT DRIVE NUMBER.

04E0                    STACK:  .BLKW   16              ;PROGRAM STACK AREA.
0500                    SP.TOP  ==      .               ;TOP OF STACK.

                        ;********************************************************
                        ; CONSOLE INPUT BUFFER AREA                            *
                        ;********************************************************

0014                    CB.SIZ  ==      20              ;CONSOLE BUFFER SIZE SET.

0500    14              RC.BUF: .BYTE   CB.SIZ  ;DECLARE BUFFER SIZE.
0501    00              RC.NBR: .BYTE   0               ;INPUT STRING SIZE.
0502                    RC.TXT: .BLKB   CB.SIZ  ;RESERVE CONSOLE BUFFER AREA.

                        ;********************************************************
```

```
                        ;********************************************************
                        ; JADE SINGLE DENSITY - IDENTITY SECTORS              *
                        ;********************************************************

0516    4A6164652044 IDS.SS: .ASCII   "JADE DD S SIDED S DENSITY FORMAT "

0536                            .LOC    IDS.SS+20H      ;LOCATE CP/M 2.2 DPB.
0536    001A                    .WORD   26              ;SECTORS PER TRACK.
0538    03                      .BYTE   3               ;BLOCK SHIFT FACTOR.
0539    07                      .BYTE   7               ;BLOCK MASK.
053A    00                      .BYTE   0               ;EXM.
053B    00F2                    .WORD   26*75/8-1       ;DISK SIZE - 1.
053D    003F                    .WORD   63              ;DIRECTORY MAXIMUM.
053F    C0                      .BYTE   11000000B       ;ALLOC 0.
0540    00                      .BYTE   0               ;ALLOC 1.
0541    0010                    .WORD   16              ;CHECK SIZE.
0543    0002                    .WORD   2               ;TRACK OFFSET.

0546                            .LOC    IDS.SS+30H      ;LOCATE DCM BLOCK.
0546    00                      .BYTE   0               ;NOT USED.
0547    02              SD.FLG: .BYTE   00000010B       ;DISKETTE FLAGS.

0596                            .LOC    IDS.SS+SEC.SZ   ;EXTEND FULL SECTOR.

                        ;********************************************************

0596    4A6164652044 IDS.DS: .ASCII   "JADE DD D SIDED S DENSITY FORMAT "

05B6                            .LOC    IDS.DS+20H      ;LOCATE CP/M 2.2 DPB.
05B6    001A                    .WORD   26              ;SECTORS PER TRACK.
05B8    04                      .BYTE   4               ;BLOCK SHIFT FACTOR.
05B9    0F                      .BYTE   15              ;BLOCK MASK.
05BA    01                      .BYTE   1               ;EXM.
05BB    00F6                    .WORD   26*152/16-1     ;DISK SIZE - 1.
05BD    003F                    .WORD   63              ;DIRECTORY MAXIMUM.
05BF    80                      .BYTE   10000000B       ;ALLOC 0.
05C0    00                      .BYTE   0               ;ALLOC 1.
05C1    0010                    .WORD   16              ;CHECK SIZE.
05C3    0002                    .WORD   2               ;TRACK OFFSET.

05C6                            .LOC    IDS.DS+30H      ;LOCATE DCM BLOCK.
05C6    00                      .BYTE   0               ;NOT USED.
05C7    0A                      .BYTE   00001010B       ;DISKETTE FLAGS.

0616                            .LOC    IDS.DS+SEC.SZ   ;EXTEND FULL SECTOR.

                        ;********************************************************
```

```
                        ;*****************************************************
                        ; JADE DOUBLE DENSITY - IDENTITY SECTORS            *
                        ;*****************************************************

    0616    4A6164652044 IDS.SD: .ASCII  "JADE DD S SIDED D DENSITY FORMAT "

    0636                         .LOC    IDS.SD+20H          ;LOCATE CP/M 2.2 DPB.
    0636    0032                 .WORD   50                  ;SECTORS PER TRACK.
    0638    04                   .BYTE   4                   ;BLOCK SHIFT FACTOR.
    0639    0F                   .BYTE   00001111B           ;BLOCK MASK.
    063A    01                   .BYTE   1                   ;EXM.
    063B    00E9                 .WORD   50*75/16-1          ;DISK SIZE - 1.
    063D    003F                 .WORD   63                  ;DIRECTORY MAXIMUM.
    063F    80                   .BYTE   10000000B           ;ALLOC 0.
    0640    00                   .BYTE   0                   ;ALLOC 1.
    0641    0010                 .WORD   16                  ;CHECK SIZE.
    0643    0002                 .WORD   2                   ;TRACK OFFSET.

    0646                         .LOC    IDS.SD+30H          ;LOCATE DCM BLOCK.
    0646    00                   .BYTE   0                   ;NOT USED.
    0647    06           DD.FLG: .BYTE   00000110B           ;DISKETTE FLAGS.

    0696                         .LOC    IDS.SD+SEC.SZ       ;EXTEND TO FULL SIZE

                        ;*****************************************************

    0696    4A6164652044 IDS.DD: .ASCII  "JADE DD D SIDED D DENSITY FORMAT "

    06B6                         .LOC    IDS.DD+20H          ;LOCATE CP/M 2.2 DPB.
    06B6    0032                 .WORD   50                  ;SECTORS PER TRACK.
    06B8    05                   .BYTE   5                   ;BLOCK SHIFT FACTOR.
    06B9    1F                   .BYTE   31                  ;BLOCK MASK.
    06BA    03                   .BYTE   3                   ;EXM.
    06BB    00EC                 .WORD   50*152/32-1         ;DISK SIZE - 1.
    06BD    007F                 .WORD   127                 ;DIRECTORY MAXIMUM.
    06BF    80                   .BYTE   10000000B           ;ALLOC 0.
    06C0    00                   .BYTE   0                   ;ALLOC 1.
    06C1    0020                 .WORD   32                  ;CHECK SIZE.
    06C3    0002                 .WORD   2                   ;TRACK OFFSET.

    06C6                         .LOC    IDS.DD+30H          ;LOCATE DCM BLOCK.
    06C6    00                   .BYTE   0                   ;NOT USED.
    06C7    0E                   .BYTE   00001110B           ;DISKETTE FLAGS.

    0716                         .LOC    IDS.DD+SEC.SZ       ;EXTEND TO FULL SIZE

                        ;*****************************************************
```

```
                        ;****************************************************
0716                    MSG.BG:         ;CONSOLE SIGN ON                   *
                        ;****************************************************

0716    0D0A            .ASCII [CR][LF]
0718    0D0A2D2D2D2D    .ASCII [CR][LF]'----------------------------------'
073A    0D0A464F524D    .ASCII [CR][LF]'FORMAT UTILITY 2 - JADE DOUBLE D'
075C    0D0A2D2D2D2D    .ASCII [CR][LF]'----------------------------------'
077E    0D0A24          .ASCII [CR][LF][EOM]


                        ;****************************************************
0781                    MSG.FD:         ;FORMAT ON DRIVE SELECT            *
                        ;****************************************************

0781    0D0A53656C65    .ASCII [CR][LF]'SELECT DRIVE TO BE FORMATTED: '[EOM]


                        ;****************************************************
07A2                    MSG.SE:         ;SELECTION ERROR                   *
                        ;****************************************************

07A2    0D0A4E4F5420    .ASCII [CR][LF]'NOT A VALID SELECTION '[EOM]


                        ;****************************************************
07BB                    MSG.FL:         ;DISPLAY FUNCTION SELECTIONS       *
                        ;****************************************************

07BB    0D0A0D0A        .ASCII [CR][LF][CR][LF]
07BF    0D0A2D2D2D2D    .ASCII [CR][LF]'----------------------------------'
07E1    0D0A20202020    .ASCII [CR][LF]'        FUNCTIONS LIST            '
0803    0D0A2D2D2D2D    .ASCII [CR][LF]'----------------------------------'
0825    0D0A            .ASCII [CR][LF]
0827    0D0A20312E20    .ASCII [CR][LF]' 1. FORMAT   DOUBLE DENSITY 8" '
0847    0D0A20322E20    .ASCII [CR][LF]' 2. FORMAT   SINGLE DENSITY 8" '
0867    0D0A20332E20    .ASCII [CR][LF]' 3. FORMAT   STANDARD 3740  8" '
0887    0D0A20342E20    .ASCII [CR][LF]' 4. READ     SYSTEM TRACKS IMAGE '
08AA    0D0A20352E20    .ASCII [CR][LF]' 5. WRITE    SYSTEM TRACKS IMAGE '
08CD    0D0A            .ASCII [CR][LF]
08CF    0D0A2D2D2D2D    .ASCII [CR][LF]'----------------------------------'
08F1    0D0A24          .ASCII [CR][LF][EOM]


                        ;****************************************************
08F4                    MSG.SF:         ;SELECT FUNCTION                   *
                        ;****************************************************

08F4    0D0A454E5445    .ASCII [CR][LF]'ENTER FUNCTION NUMBER: '[EOM]


                        ;****************************************************
```

```
                        ;***********************************************************
090E            MSG.RS:              ;READ SYSTEM ON DRIVE                     *
                        ;***********************************************************

090E    0D0A            .ASCII [CR][LF]
0910    0D0A52454144    .ASCII [CR][LF]'READ SYSTEM FROM DRIVE:  '[EOM]

                        ;***********************************************************
092B            MSG.NC:              ;TRANSFER INCOMPLETE                      *
                        ;***********************************************************

092B    0D0A            .ASCII [CR][LF]
092D    0D0A5452414E    .ASCII [CR][LF]'TRANSFER INCOMPLETE'
0942    0D0A24          .ASCII [CR][LF][EOM]

                        ;***********************************************************
0945            MSG.FE:              ;FORMAT ERROR                             *
                        ;***********************************************************

0945    0D0A            .ASCII [CR][LF]
0947    0D0A464F524D    .ASCII [CR][LF]'FORMAT TRACK ERROR'
095B    0D0A24          .ASCII [CR][LF][EOM]

                        ;***********************************************************
095E            MSG.NR:              ;SYSTEM NOT LOADED                        *
                        ;***********************************************************

095E    0D0A            .ASCII [CR][LF]
0960    0D0A53595354    .ASCII [CR][LF]'SYSTEM TRACKS NOT LOADED'
097A    0D0A24          .ASCII [CR][LF][EOM]

                        ;***********************************************************
```

```
;*********************************************************
; FORMAT - TITLE BLOCK AND PAGE ALIGNMENT                *
;*********************************************************

          .DEFINE FORMAT [NAME] = [
NAME      ==        (.!0FFH)+1       ;SET NEXT PAGE BOUNDRY.
          .LOC      NAME             ;SET LOC TO NEXT PAGE.
OFFSET    =         FMT.EA-NAME      ;DETERMINE ADDR OFFSET.
          .Z80                       ;NOW USE Z80  CODE.
          .ASCII    'FORMAT!']       ;INCLUDE HEADER!


;*********************************************************
; DENSITY - DECLARE TYPE                                 *
;*********************************************************

          .DEFINE DENSITY [TYPE] = [
          .IFIDN    [TYPE][SINGLE], [
          .ASCII    'S'
          .EXIT]
          .IFIDN    [TYPE][DOUBLE], [
          .ASCII    'D'
          .EXIT]
          .ERROR    'INVALID DENSITY']


;*********************************************************
; SECTORS - SPECIFY SEQUENCE AND NUMBER OF SECTORS       *
;*********************************************************

          .DEFINE SECTORS [LIST,NMBR] = [
LXI       H,LIST+OFFSET   ;SECTOR SEQUENCE ADDR.
MVI       E,NMBR]         ;NUMBER OF SECTORS.


;*********************************************************
; BLOCK - GENERATE A BLOCK OF CONSTANTS                  *
;*********************************************************

          .DEFINE BLOCK [COUNT,BYTE,%REPT] = [
          NMBR = COUNT              ;SET EQUAL FOR NOW.
          MVI       B,NMBR          ;LOAD NMBR OF BYTES.
%REPT:    IN        XP.DSH          ;WAIT FOR DATA REQ.
          MVI       A,BYTE          ;LOAD BYTE VALUE.
          XRA       C               ;INVERT (1791-01).
          OUT       WD.DTA          ;WRITE DATA PORT.
          DJNZ      %REPT]          ;REPEAT FOR COUNT.


;*********************************************************
```

```
                ;***********************************************************
                ; REPEAT - REPEAT FORMAT SECTION FOR EACH SECTOR        *
                ;***********************************************************

                .DEFINE REPEAT [LOCATION] = [
                DCR     E                       ;DEC NMBR SECTORS LEFT.
                JNZ     LOCATION+OFFSET]


                ;***********************************************************
                ; ENDING - RECORD NMBR OF TRAILING BYTES WRITTEN       *
                ;***********************************************************

                .DEFINE ENDING  [BYTE,%REPT] = [
                LXI     H,0                     ;COUNT OF ZERO.
        %REPT:  IN      XP.DSH                  ;WAIT FOR REQ.
                MVI     A,BYTE                  ;LOAD CONSTANT.
                XRA     C                       ;INVERT (1791-01).
                OUT     WD.DTA                  ;WRITE TO PORT.
                INX     H                       ; INCREMENT COUNT.
                JMP     %REPT+OFFSET    ;CONTINUE.]


                ;***********************************************************
```

```
                    ;**********************************************************
                    ; WRITE - WRITE SPECIFIC FORMAT BYTES                    *
                    ;**********************************************************

                            .DEFINE WRITE [TYPE,VALU] = [

                    ;*******( ID ADDRESS MARK )*****************************

                            .IFIDN   [TYPE][ID.MARK],    [
                            IN      XP.DSH              ;WAIT FOR DATA REQ.
                            MVI     A,0FEH              ;ID ADDR MARK.
                            XRA     C                   ;INVERT (1791-01).
                            OUT     WD.DTA              ;WRITE DATA PORT.
                            .EXIT]                      ;TERMINATE MACRO

                    ;*******( INDEX MARK )*********************************

                            .IFIDN   [TYPE][INDEX.MARK], [
                            IN      XP.DSH              ;WAIT FOR DATA REQ.
                            MVI     A,0FCH              ;INDEX MARK.
                            XRA     C                   ;INVERT (1791-01).
                            OUT     WD.DTA              ;WRITE DATA PORT.
                            .EXIT]                      ;TERMINATE MACRO

                    ;*******( DATA ADDRESS MARK )**************************

                            .IFIDN   [TYPE][DATA.MARK], [
                            IN      XP.DSH              ;WAIT FOR DATA REQ.
                            MVI     A,0FBH              ;DATA ADDR MARK.
                            XRA     C                   ;INVERT (1791-01).
                            OUT     WD.DTA              ;WRITE DATA PORT.
                            .EXIT]                      ;TERMINATE MACRO

                    ;*******( CRC )***************************************

                            .IFIDN   [TYPE][CRC], [
                            IN      XP.DSH              ;WAIT FOR DATA REQ.
                            MVI     A,0F7H              ;GENERATE CRC.
                            XRA     C                   ;INVERT (1791-01).
                            OUT     WD.DTA              ;WRITE DATA PORT.
                            .EXIT]                      ;TERMINATE MACRO

                    ;*******( EXPLICIT BYTE VALUE )***********************

                            .IFIDN   [TYPE][BYTE], [
                            IN      XP.DSH              ;WAIT FOR DATA REQ.
                            MVI     A,VALU              ;EXPLICIT VALUE.
                            XRA     C                   ;INVERT (1791-01).
                            OUT     WD.DTA              ;WRITE DATA PORT.
                            .EXIT]

                    ;*******( TRACK NUMBER )*****************************

                            .IFIDN   [TYPE][TRACK.NO], [
                            IN      XP.DSH              ;WAIT FOR REQUEST.
```

```
                        IN      WD.TRK          ;GET TRACK NMBR.
                        OUT     WD.DTA          ;WRITE DATA PORT.
                        .EXIT]


        ;*******( SECTOR NUMBER )*******************************

                        .IFIDN  [TYPE][SECTOR.NO], [
                        IN      XP.DSH          ;WAIT FOR REQUEST.
                        MOV     A,M             ;SET SECTOR NUMBR.
                        XRA     C               ;INVERT (1791-01).
                        OUT     WD.DTA          ;WRITE DATA PORT.
                        INX     H               ;INC SEC-NMBR PNTR.
                        .EXIT                   ;TERMINATE MACRO]


        ;*******( SIDE NUMBER )*******************************

                        .IFIDN  [TYPE][SIDE.NO], [
                        IN      XP.DSH          ;WAIT FOR REQUEST.
                        MVI     A,O             ;SET SIDE NUMBER.
                        XRA     C               ;INVERT (1791-01).
                        OUT     WD.DTA          ;WRITE DATA PORT.
                        .EXIT                   ;TERMINATE MACRO]


        ;*******( SECTOR SIZE CODE )*******************************

                        .IFIDN  [TYPE][SECTOR.SIZE], [
                        SEC.CD = OFFH           ;DECLARE BLANK.
                        .IFIDN [VALU][128],     [SEC.CD = OOOH]
                        .IFIDN [VALU][256],     [SEC.CD = OO1H]
                        .IFIDN [VALU][512],     [SEC.CD = OO2H]
                        .IFIDN [VALU][1024],    [SEC.CD = OO3H]
                        .IFE    (SEC.CD-OFFH),  [
                        .ERROR  'INVALID SECTOR SIZE']
                        IN      XP.DSH          ;WAIT FOR DATA REQ.
                        MVI     A,SEC.CD        ;LOAD SIZE CODE.
                        XRA     C               ;INVERT (1791-01).
                        OUT     WD.DTA          ;WRITE DATA PORT.
                        .EXIT                   ;TERMINATE MACRO]


        ;*******( ILLEGAL EXPANSION )*******************************

                        .ERROR  'ILLEGAL EXPANSION']


        ;*******************************************************
```

```
OA00    464F524D4154            FORMAT  FT3740
OA07    53                      DENSITY SINGLE
OA08    21 17B5                 SECTORS SS3740,26

OA0D    0628            BG3740: BLOCK   40,ONES
OA18    0606                    BLOCK   6,ZEROS
OA23    DB80                    WRITE   INDEX.MARK
OA2A    061A                    BLOCK   26,ONES
OA35    0606            RP3740: BLOCK   6,ZEROS
OA40    DB80                    WRITE   ID.MARK
OA47    DB80                    WRITE   TRACK.NO
OA4D    DB80                    WRITE   SIDE.NO
OA54    DB80                    WRITE   SECTOR.NO
OA5B    DB80                    WRITE   SECTOR.SIZE,128
OA62    DB80                    WRITE   CRC
OA69    060B                    BLOCK   11,ONES
OA74    0606                    BLOCK   6,ZEROS
OA7F    DB80                    WRITE   DATA.MARK
OA86    0680                    BLOCK   128,0E5H
OA91    DB80                    WRITE   CRC
OA98    061B                    BLOCK   27,ONES
OAA3    1D                      REPEAT  RP3740

OAA7    21 0000                 ENDING  ONES

OAB5    010203040506 SS3740:    .BYTE    1, 2, 3, 4, 5, 6, 7, 8, 9,10
OABF    0B0C0D0E0F10            .BYTE   11,12,13,14,15,16,17,18,19,20
OAC9    15161718191A            .BYTE   21,22,23,24,25,26
```

```
0B00    464F524D4154              FORMAT   FTJ50D
0B07    44                        DENSITY  DOUBLE
0B08    21  17AE                  SECTORS  SSJ50D,50

0B0D    0650          BGJ50D:     BLOCK    80,04EH
0B18    0608          RPJ50D:     BLOCK    8,ZEROS
0B23    0603                      BLOCK    3,0F5H
0B2E    DB80                      WRITE    ID.MARK
0B35    DB80                      WRITE    TRACK.NO
0B3B    DB80                      WRITE    SIDE.NO
0B42    DB80                      WRITE    SECTOR.NO
0B49    DB80                      WRITE    SECTOR.SIZE,128
0B50    DB80                      WRITE    CRC
0B57    0616                      BLOCK    22,04EH
0B62    060C                      BLOCK    12,ZEROS
0B6D    0603                      BLOCK    3,0F5H
0B78    DB80                      WRITE    DATA.MARK
0B7F    0680                      BLOCK    128,0E5H
0B8A    DB80                      WRITE    CRC
0B91    0611                      BLOCK    17,04EH
0B9C    1D                        REPEAT   RPJ50D

0BA0    21  0000                  ENDING   ONES

0BAE    010B151F29    SSJ50D:     .BYTE    1,11,21,31,41
0BB3    020C16202A                .BYTE    2,12,22,32,42
0BB8    030D17212B                .BYTE    3,13,23,33,43
0BBD    040E18222C                .BYTE    4,14,24,34,44
0BC2    050F19232D                .BYTE    5,15,25,35,45
0BC7    06101A242E                .BYTE    6,16,26,36,46
0BCC    07111B252F                .BYTE    7,17,27,37,47
0BD1    08121C2630                .BYTE    8,18,28,38,48
0BD6    09131D2731                .BYTE    9,19,29,39,49
0BDB    0A141E2832                .BYTE    10,20,30,40,50
                                  .END
```

```
BC.PTX 0009     BC.RCB 000A     BDOS   0005     BEGIN  0100
BG3740 0A0D     BGJ50D 0B0D     BS.DMA 02C5     BS.DSK 02BC
BS.FMT 02D4     BS.PTR 0001     BS.RDS 02C8     BS.SEC 02C2
BS.TRK 02BF     BS.VSZ 0033     BS.WRM 02A4     BS.WRS 02CB
B.MOVE 02D7     CB.SIZ 0014     CNS.IN 029C     CR     000D
DD.FLG 0647     EOL    00FF     EOM    0024     FD.NBR 04DF
FMT.DD 0321     FMT.EA 1700     FMT.SD 031B     FMT.ST 023B
FT3740 0A00     FTJ50D 0B00     FT.ERC 00FE     FT.STS 04D7
FT.TSM 0001     FUN.1  01AA     FUN.2  0208     FUN.3  01D2
FUN.4  01EB     FUN.5  025D     F.FLAG 04DC     IDS.DD 0696
IDS.DS 0596     IDS.SD 0616     IDS.SS 0516     ID.SEC 0001
INIT   0146     LF     000A     LIST   0164     MSG.BG 0716
MSG.FD 0781     MSG.FE 0945     MSG.FL 07BB     MSG.NC 092B
MSG.NR 095E     MSG.OT 0297     MSG.RS 090E     MSG.SE 07A2
MSG.SF 08F4     MSG.SV 04D5     NMBR   0011     NO.LOG 0001
OFFSET 0C00     ONES   00FF     RC.BUF 0500     RC.NBR 0501
RC.TXT 0502     REBOOT 0000     RP3740 0A35     RPJ50D 0B18
RST.7  04CC     SD.FLG 0547     SEC.CD 0000     SEC.NO 04DB
SEC.SZ 0080     SELECT 016A     SEL.DR 0485     SP.TOP 0500
SS3740 0AB5     SSJ50D 0BAE     STACK  04E0     ST.DMA 0324
ST.LST 03A9     SV.NBR 04DE     SYS.RF 04DD     TF.DIR 04D4
TF.INX 04D0     TF.PTR 04D2     TK0    0000     TK1    0001
TPA    0100     TRK.0  0000     TRK.1  0001     TRK.2  0002
TRK.ER 028E     TRK.MX 04DA     TRK.NO 04D9     TRK.NX 0279
TRNSFR 0355     TS.FLG 04D8     WDD.ID 02F2     WD.DTA 0007
WD.TRK 0005     WRT.ID 02FF     WSD.ID 02E2     XP.DSH 0080
ZEROS  0000
```

```
DDT
DDT VERS 2.2
-IFORMAT.COM
-R
NEXT   PC
0C00  0100
-DA00,AFF
0A00  46 4F 52 4D 41 54 21 53 21 B5 17 1E 1A 06 28 DB  FORMAT!S!......(.
0A10  80 3E FF A9 D3 07 10 F7 06 06 DB 80 3E 00 A9 D3  .>..........>...
0A20  07 10 F7 DB 80 3E FC A9 D3 07 06 1A DB 80 3E FF  .....>.........>.
0A30  A9 D3 07 10 F7 06 06 DB 80 3E 00 A9 D3 07 10 F7  .........>......
0A40  DB 80 3E FE A9 D3 07 DB 80 DB 05 D3 07 DB 80 3E  ..>............>
0A50  00 A9 D3 07 DB 80 7E A9 D3 07 23 DB 80 3E 00 A9  ......^...#..>..
0A60  D3 07 DB 80 3E F7 A9 D3 07 06 0B DB 80 3E FF A9  ....>........>..
0A70  D3 07 10 F7 06 06 DB 80 3E 00 A9 D3 07 10 F7 DB  ........>.......
0A80  80 3E FB A9 D3 07 06 80 DB 80 3E E5 A9 D3 07 10  .>........>....
0A90  F7 DB 80 3E F7 A9 D3 07 06 1B DB 80 3E FF A9 D3  ...>........>...
0AA0  07 10 F7 1D C2 35 17 21 00 00 DB 80 3E FF A9 D3  .....5.!....>...
0AB0  07 23 C3 AA 17 01 02 03 04 05 06 07 08 09 0A 0B  .#..............
0AC0  0C 0D 0E 0F 10 11 12 13 14 15 16 17 18 19 1A 00  ................
0AD0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
0AE0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
0AF0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
-DB00,BFF
0B00  46 4F 52 4D 41 54 21 44 21 AE 17 1E 32 06 50 DB  FORMAT!D!...2.P.
0B10  80 3E 4E A9 D3 07 10 F7 06 08 DB 80 3E 00 A9 D3  .>N.........>...
0B20  07 10 F7 06 03 DB 80 3E F5 A9 D3 07 10 F7 DB 80  .......>........
0B30  3E FE A9 D3 07 DB 80 DB 05 D3 07 DB 80 3E 00 A9  >............>..
0B40  D3 07 DB 80 7E A9 D3 07 23 DB 80 3E 00 A9 D3 07  ....^...#..>....
0B50  DB 80 3E F7 A9 D3 07 06 16 DB 80 3E 4E A9 D3 07  ..>........>N...
0B60  10 F7 06 0C DB 80 3E 00 A9 D3 07 10 F7 06 03 DB  ......>.........
0B70  80 3E F5 A9 D3 07 10 F7 DB 80 3E FB A9 D3 07 06  .>........>.....
0B80  80 DB 80 3E E5 A9 D3 07 10 F7 DB 80 3E F7 A9 D3  ...>........>...
0B90  07 06 11 DB 80 3E 4E A9 D3 07 10 F7 1D C2 18 17  .....>N.........
0BA0  21 00 00 DB 80 3E FF A9 D3 07 23 C3 A3 17 01 0B  !....>....#.....
0BB0  15 1F 29 02 0C 16 20 2A 03 0D 17 21 2B 04 0E 18  ..)... *...!+...
0BC0  22 2C 05 0F 19 23 2D 06 10 1A 24 2E 07 11 1B 25  ",...#-...$....%
0BD0  2F 08 12 1C 26 30 09 13 1D 27 31 0A 14 1E 28 32  /...&0...´1...(2
0BE0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
0BF0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
```